

Effects of Temperature, Salinity and Seed Age on Induction of *Zostera japonica* Germination in North America, USA

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Abstract

Seagrasses can colonize unstructured mudflats either through clonal growth or seed germination and survival. *Zostera japonica* is an introduced seagrass in North America that has rapidly colonized mudflats along the Pacific Coast, leading to active management of the species. Growth and physiology have been evaluated; however, there is little information about the factors influencing seed germination. We examined the effects of storage and induction temperature (10, 15, 20 °C) and salinity (0, 10, 20, 30), and storage period (1.5 and 26 months) on germination of seeds of the seagrass *Zostera japonica* collected from Yaquina Bay, Oregon, USA. Seed germination at 15 and 20 °C was 1.24 times higher than at 10 °C. Cumulative seed germination at salinity 0 during the first 28 days was 6.5 times greater than at a salinity of 10; similarly, initial seed germination at a salinity of 10 was 7.3 times greater than that observed for salinity 20 and 30. The proportion of germinated seeds collected in 2011 and stored for 26 months was 1.24 times greater than seeds collected in 2013 that were stored for only 6 weeks. Overall average germination rates were 21.6% and 17.1% for 2011 and 2013, respectively. Our experimental results indicate that salinity had a much stronger control over *Z. japonica* germination than temperature and the long storage period suggests that *Z. japonica* is capable of developing a persistent seed bank. We hypothesize that *Z. japonica* uses seasonal variations in temperature and salinity to avoid competition between generations favoring germination under conditions that are not optimal for the growth of mature plants.